Original Research Article

Assessment of nutritional status and dietary habits of North Indian menopausal women

Pooja Dubey[1], Kalpana Gupta[2], Raghunath Shahaji More[1],*, Khushboo Kumari[1], Jitendra Patel[1]

[1]Dept. of Anatomy, Institute of Medical Sciences BHU, Varanasi, Uttar Pradesh, India
[2]Dept. of Home Science, Banaras Hindu University, Varanasi, Uttar Pradesh, India

ABSTRACT

Introduction: Menopause is the challenging period of a woman's life marking the end of reproductive phases, normally occurring at mid forty between 45-55 years of age. Approximately 43 million of postmenopausal women is in India now. There is Drop in the level of estrogen and progesterone hormone that produce short-term and long-term effects.

Objectives: Main objectives were to assess the interventional measures in order to bring awareness and improvement in the nutritional status of menopausal women.

Materials and Methods: A total of 100 post-menopausal women subjects were selected using purposive random sampling technique. Experiment was conducted in three phases. With help of Questionnaire collected Data were analyzed by using SPSS 16 software. Majority of Selected samples were from 46 - 50 year of age group, in which 26 % had the habit of consuming milk daily while 51% once a week. 63% had the habit of exercise, 61.20 %, 26.86 % and 11.94 were following Walking, yoga and exercise percent respectively. 62 % of women had aching joint and muscle pain as a psychological symptom and vaginal dryness, skin wrinkling and skin itching. 28 % of menopausal women had problem of weight gain, bone disease. 67 percent, among all of the menopausal women had put an effort to lose weight.

Results: The prevalence of physiological symptoms and psychological symptoms were reported in more percentage. After imparting nutrition education using developed material like booklet, diet-charts, significant improvement and awareness regarding various aspects of menopause were noticed among menopausal women.

1. Introduction

The menopause is the challenging period of time for a woman's life marking the end of reproductive age and is an ongoing part of aging.[1–5] According to WHO "menopause is a stage when the menstrual cycle ceases for over 12 months and there is fall down in the levels of the two responsible hormones in women's body namely estrogen and progesterone.[6] Drop in level of estrogen and progesterone produce two types of effects, one is of short-term effect of the symptoms and another is Long term effects.[7] The short-term symptoms effect includes, hot flushes, irritability, depressions and mood swings, and Long-term effect includes Alzheimer's disease, lower back ache, cardiovascular problems, joint pain, and brittle bone. Menopause normally occurs in mid forty between the age-group of 45-55 years.[8] India is a country of large population, with 43 million of postmenopausal women and it is forecasted further to be 103 million by 2026.[9] Sometimes before the age of 40 years, menopause occurs

as a result of surgical removal irradiation or abnormalities of ovaries, or some more peri menopausal effects. [10] The phases of menopause are recognized as chronologically decreasing of hormonal production associated with postmenopausal syndrome that reduce the quality of life of many women. [11] Menopausal symptoms usually begin for 2 to 8 years prior to menopause, include mental abnormality, mood swings, anxiety, depressed feeling, irritability, lowered judgment, lowered psychomotor coordination, loss of memories, insomnia, loss of attention, tiredness, loneliness. [12] Menopausal women have many of behavioral changes including, avoid social interaction, lowered work efficiency, staying alone. [13] Balance diet and appropriate nutrient intake plays a vital role in maintaining health in menopausal women as well as all age-group while unhealthy diet and nutrient deficiencies may lead to obesity and various disorders. [14]

In Indian rural women suffer from poverty of economic and information insufficiency while India's national economy has a vital and productive working share provided by the rural women. [15]

Best of our knowledge and searching's available literature hardly any article focused nutritional status of rural postmenopausal women. Ultimate aim of this interventional Study is to assess the appropriate nutrient intake and dietary approaches among menopausal women in rural regions of north India.

2. Materials and Methods

A total sample of 100 postmenopausal women from Barhalganj town area, Gorakhpur (UP), India was selected using purposive random sampling technique. Experiment was conducted in three phases. In I phase of experiment, the information on socio-economic background, menopausal problems, exercise pattern, knowledge regarding importance of functional foods and their sources, food consumption pattern and the intake of different foods and nutrient per day were assessed.

In the II phase of experiment, the nutrition education material like booklet, Diet-charts were developed. The knowledge regarding menopause, health problems during menopause, foods important to reduce menopausal problems and their sources, importance of exercise and meditation etc. were imparted through lectures using booklet as education materials. Beside these personal and group discussions were also conducted.

In phase III The pre and post exposure data of menopausal women were collected as intervention on 10 random samples to know the impact of nutrition education.

2.1. Sampling techniques

The study was conducted within 100 menopausal women from 40-60 years of ages. Randomly selected from

Table 1: Shows about the distribution according to the demographic profile of the respondents.

Demographic profile		Mean±sd	P-value
Age (year)	40-45	28 ± 18.34	0.506
	46-50	49 ±16.32	0.7
	51-55	17 ±15.95	0.12
	56-60	6±17.49	0.57
Educational status	Illiterate	7±13.95	0.1
	Primary education	21±11.32	0.1
	High-school	16±15.23	0.88
	Intermediate	11±12.34	0.57
	Graduate	42±14.21	0.14
	Post-graduate	3±13.42	0.78
Working pattern	Homemaker	74±30.33	0.52
	Farming	2±28.21	0.35
	Anganwadi worker	6±21.20	0.506
	Teacher	8±13.41	0.77
	Other jobs	10±29.01	0.04
Type of family	Nuclear	46±5.657	0.22
	Joint	54±5.32	0.5

Table 2: Shows the distribution of the respondents according to their food habits, physical activity.

Dietary habits		Mean±sd	P-value
Food habit	Vegetarian	59±3.45	0.61
	Non- Vegetarian	28±6.54	0.22
	Eggetarian	13±7.13	0.04
Meal intake interval	2 Hours	8±14.49	0.75
	3 Hours	19±13.21	0.16
	3-4 Hours	43±12.42	0.07
	Not Specify	30±11.23	0.73
Inclusion of milk and milk product (other than tea).	Milk Daily	18±17.21	0.43
	Milk Thrice in Week	13±12.34	0.34
	Milk Twice in Week	10±11.21	0.47
	Milk Once in Week	51±12.16	0.75
Inclusion of green leafy vegetable and fruits	Daily	22±14.07	0.07
	Weekly	11±9.23	0.34
	Twice In a Week	16±10.31	0.08
	Thrice In a Week	43±14.21	0.54

Table 3: Shows the distribution of the respondents according to their physical activity

Physical activity		Mean ± Sd	P-Value
BMI	BMI<18	19±17.62	0.38
	BMI18-25	53±15.21	0.28
	BMI>25	28±13.17	0.16
Exercise habit	Yes	63±18.38	0.14
	No	37±15.22	0.34
Physical activities	Yoga	18±14.73	0.28
	Walking	37±13.12	0.14
	Exercise	8±15.1	0.11

Table 4: Shows the distribution of the complications during menopause.

Complication		Mean±sd	P-value
Psychological symptoms	Irritability	32±19.05	0.34
	Memory loss	16±23.0	0.16
	Mood swings	53±18.19	0.3
	Stress	52±9.81	0.36
	Sleeplessness	13±11.23	0.48
	Aching joint and muscle pain	62±20.16	0.46
Physiological symptoms	Hot flushes	11±23.11	0.53
	Night sweats	37±9.13	0.64
	Bloating	8±13.78	0.36
	Weight gain	37±14.23	0.31
	Vaginal dryness	53±17.86	0.3
	Breast tenderness	44±28.12	0.32

Table 5: Distribute the respondents according to their food consumption pattern, mean intake of different food groups, mean intake calories from different nutrients after imparting education.

Distribution of respondents on the basis of their mean intake of food groups		
Food group	**Intervention group**	
	Pre (gm)	**Post (gm)**
Cereal	327.91 ± 3.98	298.2± 4.32
Pulse	73.61±16.87	62.2±11.56
Green leafy vegetable	55.42±13.24	72.42±14.34
Roots and tuber	102.6±9.67	120.67±12.32
Fruits	173.02± 14.13	326.42±13.43
Milk and its product	229.1± 15.32	520.34±15.12
Sugar and jaggery	25.42±17.12	17.28±14.23
Fats and oil	29.42±17.13	16.26±13.18

Distribution of respondents on the basis of their mean intake of calories from different nutrients		
Nutrients	Intervention group	
	Pre (kcal)	Post (kcal)
Energy	2304.2± 29.56	1985.3± 18.34
Protein	45.59±17.23	56.39±13.32
Fat	63.98±12.42	37.82±14.43
Calcium	432.23±6.14	729.2±4.47
iron	23.56±12.14	29.22±11.21

Barahalganj region of Gorakhpur district attar Pradesh India. Collected Information regarding dietary habit, from different colonies of Barhalganj town-area.

A community based survey work and collection of data was done from November 2018 to March-2019. A self-designed and structured questionnaire was formulated after reviewing literate activities of different studies. Personal interview method was followed for data collection. To extract correct information, a rapport was built up with the subjects as for as possible. A good series and sequence of questions were included in questionnaire which divided in various sections.

1. General and socio economic profile.
2. Menopausal status.
3. Anthropometry data included- [BMI= weight(kg)/height(m2)] as a tool for assessing nutritional status. Digital scale was used to take weight measurement, with the accuracy of 0.1 kg and wearing lightweight clothing and without shoes.[16] BMI was calculated and analyzed by World Health Organization (2012) recommendations.[17]
4. Dietary pattern.
5. Food consumption habits and nutrient intake assessment.
6. Widely used food preferences.
7. Nutrient intake, to collect information of food consumption, nutrients intake, 24 hours recall method for three consecutive days were used and calculated mean values of the data were used for further comparative analysis with RDA.[18]
8. Physical activity- to categorize data for the physical activity pattern among sedentary, moderate or heavy working subjects.[19]

Ten (10) most affected respondents from the symptomatic disease respondents were included in the intervention of the study. Clinical and nutritional status of menopausal women was assessed and data was collected from the respondents in order to find out the root cause of nutritional deficiency symptoms in menopausal women. This part of the study includes post data collection after exposure of intervention programmed. After imparting education effectiveness of the diet chart was re-assessed after one month to check the improvements in the nutritional status of the menopausal women. The subjects were let aware about the various nutrients, importance of balanced diet as well as the essential dietary approached and requirement of basic lifestyle modifications for healthy and quality living. The interaction was mostly in Hindi language with local dialect. All selected subjects were counseled during the period of data collection. Collected data were presented with frequencies of categorical variables and to interpret data mean and the standard deviation was used.

3. Results Discussion

Demographic profile like age, educational status, working pattern, type of family shown in (Table 1). Out of the total menopausal subjects, maximum number i.e 49 ±16.32 of the respondents were of 46-50 years of age-group which almost similar to the mean age-group of menopause for

Indian women [20,21].Majority of respondents i.e. 42±14.21 were graduate while 7±13.95 were illiterate. Out of total subjects 74±30.33 respondents were house-wives, 54±5.32 were from joint family.

It was found that most of the selected menopausal women 59±3.45 were vegetarian and 43±12.42 were following 3 meal patterns in a day. It was noticed that only 18±17.21 of menopausal women had the habit of consuming milk daily and majority 51±12.16 of them were found to be consuming milk once a week. Intake of fruits, green leafy vegetables, were significantly low i.e., only 22±14.07 of women had intake it daily in their diet. physical behavior 53±15.21of respondents were held between (18-25) range of BMI. Exercise pattern revealed that 63±18.38 of respondents were found in physical activity and rest of them did not do exercise. Moreover, yoga, walking and exercise activities were reported as 18±14.73, 37±13.12 and 8±15.1 respectively. (Table 2)

In a Comparative Study of rural and urban women it is mentioned that joint and muscular symptoms was the most common problem with 62±20.16 followed by hot flushes and night sweats with 37±9.13 [22]. While a study of coastal areas of Karnataka, India showed that physical and psychosocial symptoms were reported more than vasomotor and sexual symptoms in which 56.92% of the menopausal women felt firmly that they were affected by menopause in negative aspects [23,24]. The vasomotor symptoms was occur on an average among them 60% reporting hot flushes and 47% sweating. [25] Most prevalent (94%) reported psychosocial symptoms were feeling of anxiety and nervousness and (88%) feeling depressed. While results of present study shows that mood swing 53±18.19, stress 52±9.81 irritability 32±19.05 were highly prevalent psychological symptoms among menopausal women. but in present study 62±20.16 percent of women had aching joint and muscle pain as a physiological symptom and collagen changes like vaginal dryness, skin wrinkling and skin itching breast tenderness were perceived in respondents. (Table 4) as compared to a study of Puducherry, the problem of low back ache (79%) and muscle-joint pain (77.2%). [26,27]

On the basis of data analysis of 24 hours recall method, the mean intake of food groups in a day, cereal, pulses, Sugar and jiggery, Fats and oil intake were decreased from 327.91± 3.98 to 298.2 ± 4.32, 55.42±13.24 to 72.42±14.34, 25.42±17.12 to 17.28±14.23, and 29.42±17.13 to 16.26±13.18 respectively while GLV (green leafy vegetables) , Roots & tuber , Fruits, Milk & its product, intake were increased from 55.42 ±13.24 to 72.42 ±14.34 , 102.6±9.67 to 120.67±12.32 , 173.02 ± 14.13 to 326.42±13.43 ,and 229.1± 15.32 to 520.34±15.12. respectively.

The comparative analysis of pre and post intervention data analysis of nutrients intake there was decreased in energy, and fat nutrients from 2304.2± 29.56 to 1985.3± 18.34 and respectively, while increments in protein calcium and iron intake from 45.59±17.23 to 56.39±13.32, 432.23±6.14 to729.2 ±4.47 and 23.56±12.14 to 29.22±11.21 respectively.

4. Conclusion

It can be concluded that the prevalence of physiological symptoms like insomnia, bladder problem, physical and mental exhaustion and psychological symptoms like anxiety and irritability were reported by more per cent of premenopausal women. Results indicated that before imparting nutrition education less per cent of menopausal women were having the knowledge about psychological symptoms, collagen changes and physiological symptoms which occurs during menopause. But after imparting nutrition education using developed nutrition education material like booklet, diet-charts, a significant improvement in awareness regarding various aspects of menopause was noticed among menopausal women.

5. Recommendations for Improving the Nutritional Status of Menopausal Women

In present study, improvement was observed in nutritional status of menopausal women after one month of intervention, therefore there are following long term recommendations that may help to tackle with symptoms of menopause.

1. Hence, there is need to impart nutrition education to the adult women about menopausal symptoms, food and nutrient intake, importance of consumption of functional foods, benefit of exercise, food supplementation and importance of recreational activities.
2. As it is a well-known fact that a balanced diet is necessary for a wellbeing healthy life and had an ameliorative effect for the complications of menopause at a certain extent. Menopausal women should include phytoestrogen rich foods as soyabean, flax seed etc., in which isoflavones of such food substitute estrogen hormone action in the body.
3. Attention needs to be given towards calcium rich foods intake (milk, ragi, nuts and oilseeds, fresh seasonal fruits, citrus fruits and green leafy vegetables, lettuce and fresh salads). Intake of fried foods and snacks rich in oil must be reduced.
4. Every woman should aware that menopause is an inevitable phase and therefore has to be conscious about diet, exercise and good for self-help under this stage with positive attitude towards life, sharing views with friends, spouse and relatives.
5. Beside these, modifications in lifestyle are necessary. Walking is most convenient exercise for maintaining

muscular and skeleton health and the problem of weight gaining. It is necessary to visit a gynecologist for routine health checkups which may help to optimize complications early.

On the whole, efforts are necessary for creating nutritional and health awareness among menopausal women about how to combat and tackle this important phase in their life to ensure a better quality of life.

6. Ethical Clearance

Taken from institutional ethical committee.

7. Source of Funding

None.

8. Conflict of Interest

None.

9. Acknowledgement

I would like to share my deepest gratitude by extending my sincere thanks to Prof. Archana Chakravorty, Prof T.B. Singh, and all for their kind support and help. So that I was able to accomplish my work.

References

1. Minkin MJ. Menopause: hormones, lifestyle, and optimizing aging. *Obstet Gynecol Clin North Am*. 2019;46(3):501–15.
2. Kafeel H, Ishaq H. Assessment of awareness about Post-Menopausal Symptoms and Preventive Measures. *J Sci Innov Res*. 2016;5(6):205–12.
3. Stachenfeld NS. Hormonal changes during menopause and the impact on fluid regulation. *Reprod Sci*. 2014;21(5):555–61.
4. Raju SS. Studies on ageing in India: A review. Population Ageing in India. vol. 180; 2014. p. 226.
5. Tiwari M, Barooah MS, Bhattacharyya R, Bordoloi PL, Gogoi M. Assessment of Nutritional Status among Postmenopausal Women of Jorhat. *Int J Curr Microbiol App Sci*. 2020;9(3):1187–95.
6. Younus MZ, Muzamil J. Menopausal Implications on Physiological and Psychological Status of Women. *History*. 2014;4(13):56–67.
7. Dalal PK, Agarwal M. Postmenopausal syndrome. *Indian J Psychiatry*. 2015;57(2):222–32.
8. Nappi RE, Lachowsky M. Menopause and sexuality: prevalence of symptoms and impact on quality of life. *Maturitas*. 2009;63(2):138–79.
9. Mirudhubashini K, Nisha B, Mendez AM, Jain T. An Assessment on Quality of Life Among Peri and Post-Menopausal Women in Semi Urban Area of Tamil Nadu: A Community based Cross-Sectional Study. *Indian J Public Health*. 2020;11(4):125.
10. Faubion SS, Kuhle CL, Shuster LT, Rocca WA. Long-term health consequences of premature or early menopause and considerations for management. *Climacteric*. 2015;18(4):483–91.
11. Peytavi UB, Atkin S, Gieler U, Grimalt R. Skin academy: hair, skin, hormones and menopause-current status/knowledge on the management of hair disorders in menopausal women. *Eur J Dermatol*. 2012;22(3):310–8.
12. Burger HG, Hale GE, Robertson DM, Dennerstein L. A review of hormonal changes during the menopausal transition: focus on findings from the Melbourne Women's Midlife Health Project. *Hum Reprod Update*. 2007;13(6):559–65.
13. Seguin R, Lamonte M, Tinker L, Liu J, Woods N, Michael YL, et al. Sedentary behavior and physical function decline in older women: findings from the Women's Health Initiative. *Journal of aging research*. 2012;.
14. Hagey AR, Warren MP. Role of exercise and nutrition in menopause. *Clin obstet Gynecol*. 2008;51(3):627–68.
15. Pingali P, Aiyar A, Abraham M, Rahman A. Transforming food systems for a rising India. Springer Nature; 2019. p. 368.
16. Kohansal A, Sohrabi Z, Mirzahosseini H, Naghibi M, Zare M, Haghighat N. Selection of an Acceptable Method of Evaluating Nutritional Status in Hemodialysis Patients Compared to Subjective Global Assessment: A Cross-Sectional Study. *A Cross-Sectional Study*. 2020;p. 1–15.
17. Okabayashi K, Ashrafian H, Hasegawa H, Yoo JH, Patel VM, Harling L, et al. Body mass index category as a risk factor for colorectal adenomas: a systematic review and meta-analysis. *Am J Gastroenterol*. 2012;107(8):1175–85.
18. Sanin KI, Islam MM, Mahfuz M, Ahmed AS, Mondal D, Haque R, et al. Micronutrient adequacy is poor, but not associated with stunting between 12-24 months of age: A cohort study findings from a slum area of Bangladesh. *PloS one*. 2018;13:195072.
19. Wagner A, Dallongeville J, Haas B, Ruidavets JB, Amouyel P, Ferrières J. Sedentary behaviour, physical activity and dietary patterns are independently associated with the metabolic syndrome. *Diab Metab*. 2012;38(5):428–63.
20. Pallikadavath S, Ogollah R, Singh A, Dean T, Dewey A, Stones W. Natural menopause among women below 50 years in India: A population-based study. *Indian J Med Res*. 2016;144:366–77.
21. Kaur M, Talwar I. Age at natural menopause among rural and urban Punjabi brahmin females. *Anthropol*. 2009;11(4):255–63.
22. Sagdeo MM, Arora D. Menopausal symptoms: A comparative study in rural and urban women. *J K Sci J Med Educ Res*. 2011;13(1):23–9.
23. Madhukumar S, Gaikwad V, Sudeepa D. A community based study on perceptions about menopausal symptoms and quality of life of post-menopausal women in Bangalore rural. *Int J Health Sci Res*. 2012;2(1):49–56.
24. Nayak G, Kamath A, Kumar P, Rao A. A study of quality of life among perimenopausal women in selected coastal areas of Karnataka. *India J Midlife Health*. 2012;3(2):71–6.
25. Karmakar N, Majumdar S, Dasgupta A, Das S. Quality of life among menopausal women: A community-based study in a rural area of West Bengal. *J Midlife Health*. 2017;8(1):21–7.
26. Poomala GK, Arounassalame B. The quality of life during and after menopause among rural women. *J Clin Diagn Res*. 2013;7(1):135–9.
27. Sarkar A, Pithadia P, Goswami K, Bhavsar S, Makwana NR, Yadav S. A study on health profile of post-menopausal women in Jamnagar district. *Gujarat J Res Med Dent Sci*. 2014;2(2):25–34.

Author biography

Pooja Dubey, Research Scholar

Kalpana Gupta, Professor

Raghunath Shahaji More, Associate Professor

Khushboo Kumari, Research Scholar

Jitendra Patel, Research Scholar